to be different depending on exposure conditions;

measuring a transmittance of an optical system at said set measurement interval;

setting an exposure amount control target value in accordance with said measured transmittance of said optical system; and

transferring said pattern onto said substrate through said optical system while an exposure amount is controlled based on photodetection results of a part of said exposure light and said set exposure amount control target value.

4. (Amended) An exposure method according to Claim 1, wherein said exposure condition includes a transmittance of a mask.

5. (Amended) An exposure method according to Claim 1, wherein said exposure condition includes one of a minimum line width and a permissible exposure amount error.

6. (Amended) An exposure method performed by an exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said method comprising:

photodetecting a part of said exposure light in an optical path of said exposure light;

setting a measurement interval of a transmittance of said optical system which is arranged between a position of photodetecting a part of said exposure light and said substrate in accordance with a variation amount of transmittance of said optical system;

setting an exposure amount control target value in accordance with said measured transmittance of said optical system at said set measurement interval; and

transferring said pattern onto said substrate through said optical system while an exposure amount is controlled based on photodetection results of a part of said exposure light and said set exposure amount control target value.

14. (Amended) An exposure method to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said method comprising:

setting a measurement interval in accordance with an exposure condition; and

measuring a variation in the amount of said exposure light which passes through said optical system and reaches onto said substrate at said set measurement interval.

22. (Amended) An exposure method to transfer a pattern illuminated with exposure light from a light source through an optical system onto a substrate, said method comprising:

setting a measurement interval in accordance with an exposure condition; and

measuring an amount of said exposure light which passes through said optical system and reaches onto said substrate at said measurement interval.

24. (Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

a branch optical system arranged in an optical path of said exposure light to branch a part of said exposure light;

an optical system arranged between said branch optical system and said substrate;

a transmittance measurement unit to measure a transmittance of said optical system;

a control unit connected with said transmittance measurement unit to set a measurement interval of said transmittance measurement unit in accordance with an exposure condition;

an exposure amount setting unit connected with said transmittance measurement unit to set an exposure amount control target value in accordance with said measured transmittance of said optical system; and

an exposure amount control system connected with said exposure amount setting unit to control an exposure amount based on said set exposure amount control target value;

wherein said transmittance measurement unit measures a transmittance of said optical system at said set measurement interval.

28. (Amended) An exposure apparatus according to Claim 24, further comprising:

an information reading unit to read information of a mask on which the pattern is formed, and

said control unit automatically determines measurement intervals for said transmittance measurement unit based on said information of said mask read by said information reading unit.

29. (Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

a branch optical system arranged in an optical path of said exposure light to branch a part of said exposure light;

an optical system arranged between said branch optical system and said substrate;

a transmittance measurement unit to measure a transmittance of said optical system;

a control unit connected with said transmittance measurement unit to set a transmittance measurement interval of said transmittance measurement unit in accordance with a variation amount between a transmittance obtained by a most recent transmittance measurement and a transmittance obtained by a measurement performed before said most recent measurement, said respective measurement performed by said transmittance measurement unit;

an exposure amount setting unit connected with said transmittance measurement unit to set an exposure amount control target value in accordance with said measured transmittance of said optical system; and

an exposure amount control system connected with said exposure amount setting unit to control an exposure amount based on said set exposure amount control target value; wherein

said transmittance measurement unit measures a transmittance of said optical system at said set measurement interval.

32. (Amended) An exposure apparatus according to Claim 29, further comprising:

a first sensor to photodetect a part of said exposure light, said first sensor being arranged in the optical path of a part of said exposure light branched by said branch optical system, and

a second sensor arranged to be substantially flush with said substrate to photodetect said exposure light passing through said optical system; wherein

said transmittance measurement unit includes

a control unit to obtain a transmittance of said optical system, based on an output signal which said first sensor outputs by photodetecting a part of said exposure light and an output signal which said second sensor outputs by photodetecting said exposure light passing through said optical system.

34. (Amended) An exposure apparatus according to Claim 24, wherein said control unit sets a measurement interval of said transmittance measurement unit in accordance with a transmittance of said mask on which said pattern is formed.

35. (Amended) An exposure apparatus according to Claim 24, wherein said control unit sets a measurement interval of said transmittance measurement unit in accordance with one of a minimum line width and a permissible exposure amount error.

42. (Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

a branch optical system arranged in an optical path of said exposure light to branch a part of said exposure light;

an optical system arranged between said branch optical system and said substrate;

a first sensor arranged in the optical path of a part of said branched exposure light to photodetect a part of said exposure light;

a second sensor arranged substantially flush with said substrate to photodetect said exposure light passing through said optical system;

a measurement unit connected with said first sensor and said second sensor to measure a variation in an amount of exposure light passing through said optical system, based on an output signal from said first sensor and an output signal from said second sensor; and

a control unit connected with said measurement unit to change an interval of a measurement performed by said measurement unit in accordance with an exposure condition.

46. (Amended) An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said exposure apparatus comprising:

a measurement unit to measure an amount of exposure light passing through said optical system and reaching onto said substrate at a predetermined interval; and

a control unit connected with said measurement unit to set said interval of a measurement performed by said measurement unit in accordance with an exposure condition.

Please add the following new claims:

59. (New) An exposure method according to Claim 1, wherein a part of said exposure light is branched away from said exposure light by a branch optical system arranged in an optical path of said exposure light, and said optical system includes a plurality of optical

elements arranged between said branch optical system and said substrate.

60. (New) An exposure method according to Claim 6, wherein a variation amount of a transmittance of said optical system is calculated based on a transmittance obtained by a most recent transmittance measurement and a transmittance obtained by a transmittance measurement performed before said most recent transmittance measurement.

61. (New) An exposure apparatus according to Claim 24, further comprising:

a first sensor arranged in an optical path of a part of said exposure light which is branched by said branch optical system to photodetect a part of said exposure light, and

a second sensor arranged substantially flush with said substrate to photodetect said exposure light passing through said optical system; wherein

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said transmittance measurement unit comprises

a control unit which obtains a transmittance of said optical system, based on an output signal which said first sensor outputs by photodetecting a part of said exposure light and an output signal which said second sensor outputs by photodetecting said exposure light passing through said optical system.

62. (New) An exposure apparatus according to Claim 45, wherein said predetermined conditions include an irradiation time of said exposure light on said optical system, an exposure light intensity, and an irradiation amount.

63. (New) An exposure method according to Claim 19, wherein said time-varying function is a function expressed by

$$T = a \cdot \exp\left(\sum_{i=1}^{k} b_i t\right)$$

in which T is said transmittance of said optical system, "a" is a parameter representing a rate of change in said transmittance, and b_i is a parameter dependent on each exposure condition including an illumination condition.

64. (New) An exposure method according to Claim 19, further comprising prior to said prediction function determining:

measuring a period of time in which said exposure apparatus most recently stops operation;

measuring an irradiation time of exposure light on said optical system in a self-cleaning operation which is performed after said exposure apparatus most recently stops operation;

measuring an exposure light intensity; and

measuring an irradiation amount.

65. (New) An exposure method according to Claim 19, wherein environmental conditions for said optical system are measured at a predetermined time interval, and said environmental conditions are considered when said transmittance time-varying prediction function is determined.

66. (New) An exposure method according to Claim 19, further comprising:

measuring a transmittance of said optical system at a predetermined interval, and

correcting said transmittance time-varying prediction function each time a transmittance measurement is performed.

67. (New) An exposure method according to Claim 66, wherein said predetermined interval of said measuring said transmittance is determined in respect to a relationship with a required exposure precision.